U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Pyrgulopsis thompsoni*

COMMON NAME: Huachuca springsnail

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status
___ New candidate
_X_ Continuing candidate
___ Non-petitioned
_X_ Petitioned - Date petition received: May 11, 2004
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
Higher priority listing actions, including court-approved settlements, court-ordered statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

__ Listing priority change
Former LP:
New LP:

Date when the species first became a Candidate (as currently defined): February 28, 1996

___ Candidate removal: Former LPN: ___
___ A – Taxon is more abundant or widespread than previously believed or not subject to

the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails: Gastropoda, Hydrobiidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona and Sonora, Mexico

LAND OWNERSHIP: In the United States, 55 percent Federal (Fort Huachuca and Coronado National Forest) and 45 percent private. In Mexico, 100 percent private. We estimate approximately 15 acres (6 hectares) of habitat on Federal and private land.

LEAD REGION CONTACT: Sarah Quamme, 505-248-6419, *Sarah_Quamme@fws.gov*

LEAD FIELD OFFICE CONTACT: Mike Martinez, Arizona Field Office, Phoenix, 602-242-0210 ext. 224, *Mike_A_Martinez@fws.gov*

BIOLOGICAL INFORMATION

Species Description: Hershler and Landye (1988, pp. 41-43) describe the species as a moderate to large size for snails in that family, with a shell height of 0.07 to 0.13 inches (1.7 to 3.2 millimeters). The shell is moderately convex with slightly shouldered whorls. The inner lip of the shell is thin. The aperture is fused to or separate from body whorl. The umbilicus is chink-like or open.

Taxonomy: The Huachuca springsnail is a member of the family Hydrobiidae (Phylum Mollusca; Class Gastropoda; Subclass Prosobranchia). It is one of approximately 170 known species of Hydrobiid snails in the United States. It was originally identified by Landye (1973, p. 25), and Bequart and Miller (1973, pp. 213-214) as a *Fontelicella* species from specimens collected at Peterson Ranch Springs, Sylvania Springs, and Monkey Springs, in Santa Cruz and Cochise counties, Arizona. Landye (1981, p. 28) treated populations from Canelo Hills Cienega, Monkey Springs, and Sheehy Springs as three separate *Fontelicella* species. These populations were synonomized and the species was fully described by Hershler and Landye (1988, pp. 41-43) as *Pyrgulopsis thompsoni* from specimens collected from Cottonwood Springs, Monkey Springs,

Canelo Hills Cienega, Sheehy Springs, and Peterson Ranch Springs, Santa Cruz County, Arizona; and from Ojo Caliente, Sonora, Mexico. We have carefully reviewed the available taxonomic information and concluded that *P. thompsoni* is a valid taxon.

There is relatively new information that shows significant genetic divergence between populations of this species, particularly between populations on the east slope of the Huachuca Mountains and those at lower elevations along Sonoita Creek and in the San Rafael Valley (Hurt 2004, p. 12). What these differences mean to the taxonomy of springsnail populations currently defined as Huachuca springsnail is unknown, particularly since not every site currently identified as Huachuca springsnail was included in the original taxonomic study conducted by Hershler and Landye (1988).

Historical and Current Range/Distribution: The species was first collected in 1969. Based on information in our files, there is no documentation of extirpation of Huachuca springsnail from any known locality. Although loss of cienegas during the last century in southeastern Arizona is well-documented (Hendrickson and Minckley 1984, p. 131), we do not know whether that loss resulted in the loss of any population of Huachuca springsnail.

The original description of the species by Hershler and Landye (1988, p. 41) examined specimens from five sites in Santa Cruz County, Arizona (Cottonwood Springs, Monkey Springs, Canelo Hills Cienega, Sheehy Springs, and Peterson Ranch Springs) and one from one site in Sonora, Mexico (Ojo Caliente). The range of the species has subsequently been expanded to include several other sites where the species was located by various researchers and agency personnel. Landye (1999, p. 1) lists 15 spring localities from which the species is known: Garden Canyon (two distinct springs), Huachuca Canyon (two distinct springs), McClure Spring, Broken Pipe Spring, Cave Spring, Sawmill Spring, and Blacktail Spring on Fort Huachuca; Scotia Canyon/Peterson Ranch Spring, Monkey Spring, Cottonwood Spring, Sheehy Spring, and Canelo Hills Cienega on private lands; and Ojo Caliente in Mexico. Nine of these localities are from the Fort Huachuca Army Post including Garden Canyon upper spring, Garden Canyon middle spring, McClure Spring, Broken Pipe Spring, Cave Spring, Sawmill Spring, Huachuca Canyon upper spring, Huachuca Canyon main spring, and Blacktail Spring (Landye 1993, p. 2).

Landye (1995, p. 1) indicates that sites with hydrobiids discussed by Frest (1993, p. 1) are Huachuca springsnail and include Conger Creek, Cienega Creek, Ramsey Canyon, Redfield Canyon, and Wet Beaver Creek. Landye (1999, p. 1) also listed three other potential but uncomfirmed sites including Mattie Canyon, Tombstone Reservoir, and Ramsey Canyon. The U.S. Fish and Wildlife Service (Service) (1995, p. 4) lists most of the same sites mentioned above, but recognized two other sites on the Coronado National Forest, Sylvania Spring and Tombstone Reservoir. The Arizona Game and Fish Department (2003, p. 2) lists 13 sites: Monkey Canyon, Sonoita Creek, Santa Cruz River, Canelo Hills Cienega, Scotia Canyon, Garden Canyon, McClure Canyon, Sawmill Canyon, Huachuca Canyon, Blacktail Canyon, Ramsey Canyon, Cienega Creek, and Redfield Canyon. Varela-Romero *et al.* (1992, p.1) reported the species from Cienega Los Fresnos in Sonora, Mexico. During field sampling for genetic analysis and habitat studies, Hurt (2004, p. 12) sampled nine sites (Bear, Canelo Hills, Cottonwood, McClure, Garden, Cave, Monkey, Peterson Ranch, and Sawmill) and Tsai *et al.*

(2007, p. 214) sampled eight sites (Garden Canyon, McClure, Cave Spring 1 and 2, Sawmill Spring, Huachuca Spring 1, 2, and 3, all of which appear to overlap with sites previously identified. NatureServe lists the species at 16 historical sites on its website (*http://www.natureserve.org/explorer/servlet/NatureServe?searchSciOrCommonName=pyrgulopsis+thompsoni&x=3&y=2,* February 26, 2010).

The discrepancy in the number of sites presented by various authors reflects confusion over names and locations of springs, with some springs having multiple names and vague location descriptions. A synthesis of this information indicates the species occurs at 21 sites, 19 in Arizona and two in Sonora, Mexico (Myers 2010, p. 1).

Habitat/Life History: In the arid Southwest, snails of the family Hydrobiidae are largely relicts of the wetter Pleistocene Age (1.6 million – 10,000 years ago) and are typically distributed across the landscape as geographically isolated populations exhibiting a high degree of endemism (found only in a particular area or region) (Bequart and Miller 1973, p. 214; Taylor 1987, pp. 5-6; Shepard 1993, p. 354; Hershler and Sada 2002, p. 255). Springsnails are strictly aquatic and respiration occurs through an internal gill. Springsnails in the genus *Pyrgulopsis* are egg-layers (Hershler 1998, p. 14). The larval stage is completed in the egg capsule and upon hatching, tiny snails emerge into their adult habitat (Brusca and Brusca 1990, p. 759; Hershler and Sada 2002, p. 256). The sexes are separate and physical differences are noticeable between them, with females being larger than males. Mobility is limited and significant migration likely does not occur, although aquatic snails have been known to disperse by becoming attached to the feathers of migratory birds (Roscoe 1955, p. 66; Dundee *et al.* 1967, pp. 89-90).

Hydrobiid snails feed primarily on periphyton, which is a complex mixture of algae, bacteria, microbes, and detritus that live upon submerged surfaces in aquatic environments (Mladenka 1992, pp. 46, 81; Hershler and Sada 2002, p. 256; Lysne *et al.* 2007, p. 649). The life span of most aquatic snails is 9 to 15 months (Pennak 1989, p. 552). Predators of springsnails include waterfowl, shorebirds, amphibians, fishes, crayfish, leeches, and aquatic insects. Limited information on disease or parasites in springsnails is available, though aquatic snails can serve as intermediate hosts for trematodes (parasitic flatworms) (Dillon 2000, p. 227; Schmidt and Roberts 2000, p. 1).

Hydrobiid snails occur in springs, seeps, marshes, spring pools, outflows, and diverse lotic (flowing) waters. Springsnail habitats are typically isolated, permanently saturated, spring-fed aquatic climax communities commonly described as ciénegas (Hendrickson and Minckley 1984, pp. 133-134). The most common habitat for the Huachuca springsnail is a rheocrene ecosystem (water emerging from the ground as a flowing stream). Substrate is typically firm and characterized by cobble, gravel, woody debris, and aquatic vegetation. These substrate types provide suitable surfaces for grazing and egg laying (Taylor 1987, p. 5; Hershler 1998, p. 14). *Pyrgulopsis* species are rarely found on or in soft sediment (Hershler 1998, p. 14). They are typically found more often, and in greater abundance, in gravel to cobble size substrates (Frest and Johannes 1995, p. 203; Malcom *et al.* 2005, p. 75; Martinez and Thome 2006, pp. 12-13; Lysne *et al.* 2007, p. 650; Martinez and Myers 2008, p. 191). The habitat of the Huachuca springsnail is characterized by various aquatic and emergent plant species that occur within

plains grassland, oak and pine-oak woodlands, and coniferous forest vegetation communities within the Huachuca Mountains and the San Rafael Valley. The species is typically found in the shallower areas of springs, often in gravelly seeps at the spring source.

Proximity to spring vents, where water emerges from the ground, plays a key role in the life history of springsnails. Many springsnail species exhibit decreased abundance further away from spring vents, presumably due to their need for stable water chemistry and flow regime provided by spring waters (Hershler 1984, p. 68; Hershler 1998, p. 11; Hershler and Sada 2002, p. 256; and Martinez and Thome 2006, p. 14). Several habitat parameters of springs, such as substrate, dissolved carbon dioxide, dissolved oxygen, temperature, conductivity, and water depth, have been shown to influence the distribution and abundance of *Pyrgulopsis* snails (O'Brien and Blinn 1999, pp. 231-232; Mladenka and Minshall 2001, pp. 209-211; Malcom *et al.* 2005, p. 75; Martinez and Thome 2006. pp. 12-15; Lysne *et al.* 2007, p. 650; Martinez and Myers 2008, p. 191-192). Dissolved salt may also be an important factor, because it is essential for shell formation (Pennak 1989, p. 552). Tsai *et al.* (2007, p. 216) found that distribution of Huachuca springsnail was greater in cooler, more oxygenated, and less turbid spring water.

Based on our current knowledge, important habitat elements appear to include: 1) permanent free-flowing springs; 2) shallow, unpolluted water; 3) coarse firm substrates such as pebble, gravel, cobble, and woody debris; and 4) native aquatic macrophytes, algae, and periphyton.

Population Estimates/Status: Populations of Huachuca springsnails are limited to small sites that are separated by many miles. Actual or estimated population sizes (abundance) are unknown. However, at seven springs, Tsai *et al.* (2007) counted 3,100 individuals in June and 4,176 in July of 2003, in samples collected at 5 meter intervals. The July count was made following the start of summer rains, which the authors thought explained the increase.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range. The Huachuca springsnail is threatened by habitat modification and loss through catastrophic wildfire, drought, streamflow alteration, and, potentially, grazing, recreation, military activities, and timber harvest. As discussed above, springsnails prefer habitats dominated by larger substrates and proximity to spring vents; spring water quality (temperature, oxygenation and turbidity) influences the distribution of the springsnail. Habitat modification can cause changes in substrate composition or water quality to thresholds that are outside of parameters used by the species, resulting in reduced fecundity, recruitment, population viability, and extirpation. The significance of habitat modification for springsnails is reflected in Hershler and Williams (1996, p. 1), who recommend that efforts to maintain springsnail populations should focus on maintenance of natural springhead integrity. Therefore, any activities which alter substrate composition or degrade water quality would likely adversely affect the Huachuca springsnail.

Altered stream flows, whether by drought, groundwater pumping, impoundment, or other direct stream alterations, could affect the Huachuca springsnail by eliminating habitat, if flows stop completely, or altering the specific habitat parameters so that the habitat is no longer suitable. At

least one site at which the Huachuca springsnail occurs, Peterson Ranch Springs, has been altered by an impoundment resulting in springhead inundation (ponding of water). This represents approximately 8 percent of the species range. The effects of this past alteration on the springsnail population are difficult to assess because population sizes and distributions were unknown prior to spring alterations. Additionally, development and associated groundwater pumping in the Sonoita Creek basin may be a potential threat to this population. While further investigation is needed to determine if this is in fact a potential threat, groundwater depletion has been implicated in the decline of other freshwater mollusks (Landye 1973, p. 1; Landye 1981, p. 1; 70 FR 46304; August 9, 2005).

Another primary threat to the Huachuca springsnail is catastrophic fire. Fire frequency and intensities in southwestern forests are much altered from historical conditions (Dahms and Geils 1997, pp. 34-35). Before 1900, surface fires generally occurred at least once per decade in montane forests with a pine component. Beginning about 1870-1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels coupled with effective fire suppression in the mid to late 20th century that prevented frequent, widespread ground fires (Swetnam and Baisan 1996, pp. 20-25). Absence of ground fires allowed a buildup of woody fuels that precipitated infrequent but intense crown fires (Danzer *et al.* 1997, pp. 30-33). Lack of vegetation and forest litter following intense crown fires exposed soils to surface erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and Neary 1996, pp. 70-75).

Catastrophic fire could result in habitat loss in the Huachuca Mountains. A fire in occupied springsnail habitat could extirpate the population through habitat modification in the form of sedimentation and erosion. The U.S. Army (2006, p. 239) believes that fire is the greatest threat to the species because watershed conditions could result in fire that causes a decline or extirpation of springsnail populations on Fort Huachuca. At least three populations occur on the east slope of the Huachuca Mountains (Hurt 2004, p. 12) representing approximately 23 percent of the species range. We consider fire-prone conditions to occur throughout the range of the species in the United States.

Furthermore, millions of gallons of fire retardants and suppressants are broadly applied aerially and from the ground to wildlands in the western United States each year. Contamination of aquatic sites can occur via direct application or runoff from treated uplands. These chemicals are ammonia-based, which in itself can be potentially toxic; however, many formulations also contain yellow prussiate of soda (sodium ferrocyanide), which is added as an anticorrosive agent. Such formulations kill a variety of aquatic and other organisms. Toxicity of these formulations is typically found to be low in the laboratory, but in the field toxicity to aquatic life has been found to be photoenhanced by ambient ultraviolet radiation (Calfee and Little 2003, p. 1529-1533). It is suspected that an errant fire retardant drop was responsible for the near extirpation of the Three Forks springsnail (*Pyrgulopsis trivalis*), a closely related species, from a site in east-central Arizona (Service 2007, p. 7).

Additionally, occupied springsnail sites may be affected by grazing, recreational use, military activities, and timber harvest. Livestock grazing currently occurs on the Coronado National

Forest, but is excluded from Fort Huachuca. Grazing may affect springsnails directly through trampling and indirectly through habitat degradation by denuding vegetation and affecting water quality. A population of Chupadera springsnail (*Pyrgulopsis chupaderae*) endemic to a spring in Socorro County, New Mexico, was extirpated due to the impacts of livestock grazing on its habitat (Arritt 1998, p. 10). Huachuca springsnail sites on Fort Huachuca are susceptible to adverse effects from human recreational activities, such as vehicle use, incidental human-caused fire, and disturbance from trampling (U.S. Army 2006, p. 239). However, military training and testing are limited in the Huachuca Mountains and seldom occur in known springsnail localities (U.S. Army 2006, p. 239).

Timber harvest could impact springsnails through complete removal of appropriate habitat or increasing sedimentation due to lack of vegetation. Since seven Huachuca springsnail sites occur on these Federal lands, 55 percent of the species range is affected by either grazing or recreational human activities.

In summary, the Huachuca springsnail is threatened by habitat loss and modification that may result from water diversion, catastrophic wildfire, grazing, timber harvest, and recreational use. Although we lack specific information on the likelihood and frequency of these activities in occupied Huachuca springsnail habitat, we believe they are substantial enough to constitute viable threats to the species.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
The Huachuca springsnail has been subjected to a limited number of scientific studies and collections intended to determine taxonomy, distribution, and habitat use. Although sampling-without-replacement can reduce population size of spring-dependent invertebrates, including springsnails (Martinez and Sorensen 2007, p. 29), studies conducted on Huachuca springsnail have not resulted in the removal of large numbers of springsnails and are not believed to have had any negative effect on the species. The species is not known to be utilized for commercial or recreational purposes. Therefore, this is not known to be a factor threatening the Huachuca springsnail.

C. Disease or predation.
The threat from disease or predation to the Huachuca springsnail has not been investigated. However, springsnails and other mollusks are known to serve as the intermediate hosts for a variety of trematodes and as prey for nonnative fish (Raisenen 1991, p. 71) and crayfish (Fernandez and Rosen 1996, pp. 24-25). At this time, disease or predation is not known to be a factor threatening the Huachuca springsnail.

D. The inadequacy of existing regulatory mechanisms.
The Huachuca springsnail is protected by Arizona Game and Fish Commission Order 42 for Crustaceans and Mollusks, which establishes a closed season for the species. This rule prohibits collection and harvest, but does not protect against habitat modification like fire or other natural catastrophic events.

The species may be afforded some regulatory protection by occurring with or near other listed

species, such as the Huachuca water umber, Sonora tiger salamander, and Mexican spotted owl. The extent and magnitude of these benefits to the Huachuca springsnail is difficult to quantify. However, Federal actions affecting these species would require consultation under section 7 of the Endangered Species Act. Some of these activities may include fire suppression activities, water diversions, grazing permits, recreation permits, and timber harvest.

E. Other natural or manmade factors affecting its continued existence.
All populations of Huachuca springsnail are limited to very small sites. Extirpation of a population may result from major storms, drought, fire, or other natural events. Because populations are isolated, if extirpated, sites are unlikely to be naturally recolonized.

Small populations are also subject to genetic deterioration and demographic variability, which increases the likelihood of extinction.

Periods of drought in the Southwest are not uncommon; however, the frequency and duration of dry periods may be altered by future climate change. Global climate change and associated effects on regional climatic regimes, is not well understood, but the predictions for the Southwest indicate less overall precipitation and longer periods of drought. Seager *et al.* (2007, p. 1181) predict, based on broad consensus among 19 climate models, that the Southwest will become drier in the 21st century and that the transition to this drier state is already underway. The increased aridity associated with the current ongoing drought will become the norm for the Southwest within a timeframe of years to decades, if the models are correct. Certainly this species, along with its habitat, will be affected in some manner by climate change; but the magnitude and extent of the change cannot be quantified at this time.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED
The Huachuca springsnail is identified as a *Species of Greatest Conservation Need* (tier 1a) in the Arizona State Wildlife Action Plan prepared by the Arizona Game and Fish Department. This plan helps guide the Arizona Game and Fish Department and other agencies in determining what biotic resources should receive priority management consideration. Conservation benefits would mostly come from proactive initiatives.

The Service began discussions with Fort Huachuca in 1995 regarding the development of a conservation agreement. A prelisting notification letter was sent out to experts, interested persons, and potentially affected parties in November 1998. Fort Huachuca indicated that it has taken, or would be taking in the near future, considerable measures to alleviate impacts to the species (Cochran 1999, p. 1). Arizona Game and Fish Department has also contacted Fort Huachuca and expressed interest in a conservation agreement. Because almost 50 percent of the known sites in the United States are on private lands, participation by private landowners would be critical for an agreement to be viable. The City of Sierra Vista has indicated that they believe a conservation agreement may suffice to conserve the species (O'Hair 1999). No substantial progress has been made on the development of a conservation agreement to date.

SUMMARY OF THREATS

Habitat modification, grazing, groundwater pumping, recreation, vulnerability to catastrophic events, and lack of adequate regulatory mechanisms all continue to be threats to the species. Degradation to cienegas (marshes) in the Southwest has occurred, and the information we have regarding the landscape-level threats leads us to believe that habitat loss may affect the springsnail. Drought and the risk of wildfires may continue to be threats as Arizona continues to be in a severe drought. The Forest Service is taking measures to minimize fuel loads in order to abate the occurrence of crown fires, but such efforts could take years to be realized. Fort Huachuca has recognized the status of the springsnail and is taking steps to address its conservation status, but threats still exist. Though many potentially suitable sites in the southern half of the Huachuca Mountains may exist, they have not been surveyed for Huachuca springsnail. We find that the Huachuca springsnail is warranted for listing throughout all of its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

___Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

The following conservation measures have been identified: evaluate current landscape distribution, define habitat characteristics, evaluate the relationship between genetics and taxonomy, assess threats at finer landscape scales, and develop conservation measures to protect habitat and monitor species through a comprehensive conservation agreement.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	**Imminent**	Monotypic genus	7
		Species	8*
		Subspecies/population	9
		Monotypic genus	10

	Non-imminent	Species Subspecies/population	11 12

Rationale for listing priority number:

Magnitude: At the landscape scale, all of the springs in which the species is found are subject to some form of impacts, such as wildfire, grazing, and recreation. However, because multiple landowners (i.e. Forest Service, Fort Huachuca) are including consideration for the springsnail or other co-occurring listed species in their activities, the magnitude of threats across the range is considered moderate. In other words, threats are not occurring throughout the range of the species uniformly and not all populations would likely be impacted simultaneously by any of the known threats.

Imminence: The maintenance of habitats in modified conditions, livestock grazing, susceptibility to fire, and recreation, are all ongoing threats that are currently occurring. Therefore, we conclude that threats to this species are imminent.

Rationale for Change in Listing Priority Number: N/A

__X__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

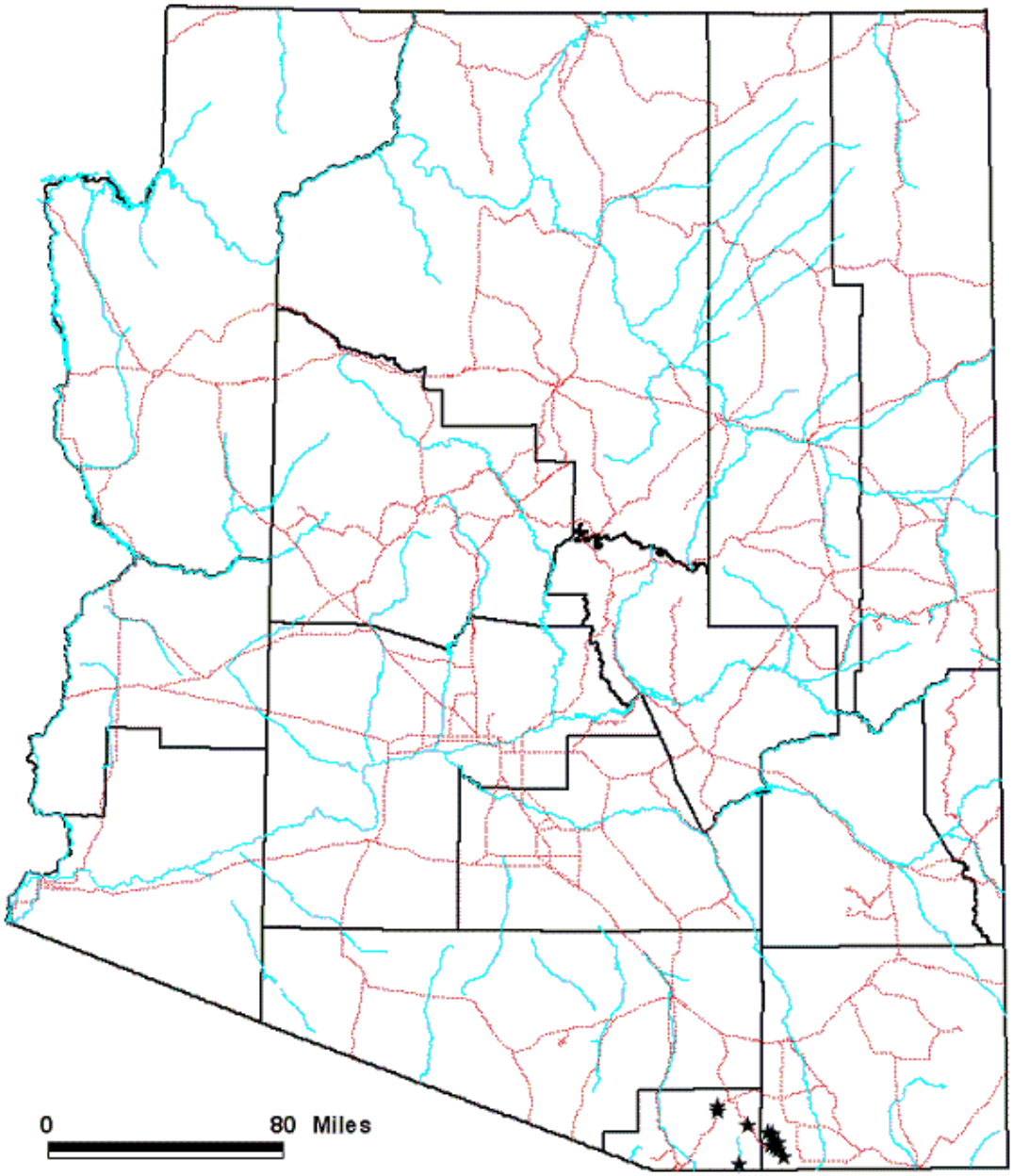
Is Emergency Listing Warranted? No. Some populations of the Huachuca springsnail are afforded protection from immediate threats by their occurrence on lands occupied by listed species.

DESCRIPTION OF MONITORING
We are unaware of any ongoing monitoring. We have previously collaborated with the University of Arizona Cooperative Research Unit to develop a grant proposal to secure funding for a genetic study aimed at clarifying the phylogenetic relationships of all Huachuca springsnail populations. However, this proposal has not been funded.

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Arizona

Indicate which State(s) did not provide any information or comments: N/A

Pyrgulopsis thompsoni occurrences in Arizona



★ Pyrgulopsis thompsoni
State highways
Major Waterways
County Lines

Heritage Data Management System, April 28, 2006.

Heritage Fund
Lottery dollars at work

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: _____ May 21, 2010

Acting Regional Director, Fish and Wildlife Service Date

Concur: _____ Date: October 22, 2010

ACTING

Director, Fish and Wildlife Service

Do not concur: _____ _____

Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 2010
Conducted by: Mike Martinez